

Find the vertex of the parabola

$$f(x) = -2x^2 + 16x + 18$$

Put the function into vertex form

ACTIVITY

4.4

Comparing Quadratics in
Different Forms

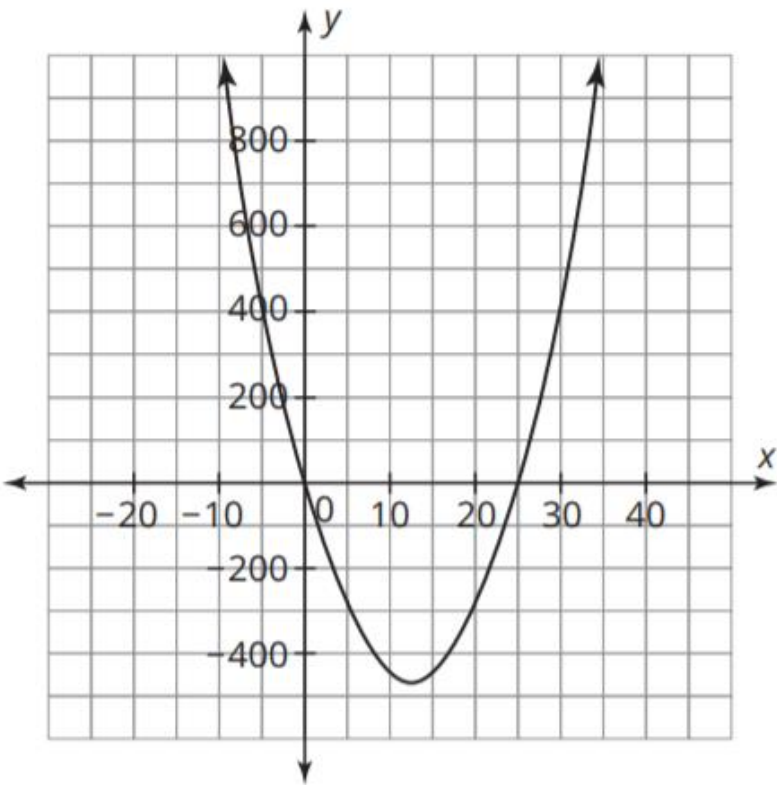
Maya saved up some money and decided to take a risk and invest in some stocks. She invested her money in Doogle, a popular computer company. Unfortunately she lost it all in just 25 months. The change in her money during this time can be represented by the function $v(x) = 75 + 72x - 3x^2$, where v is the value of her investment and x is the time in months.

1. Three quadratic functions are shown. Which of these models represents Maya's investment money over time? Explain your choice and why you eliminated the other model(s).

Model 1

$$v(x) = -3(x + 1)(x - 25)$$

Model 3



Model 2

x	y
0	0
3	197
15	450
25	0

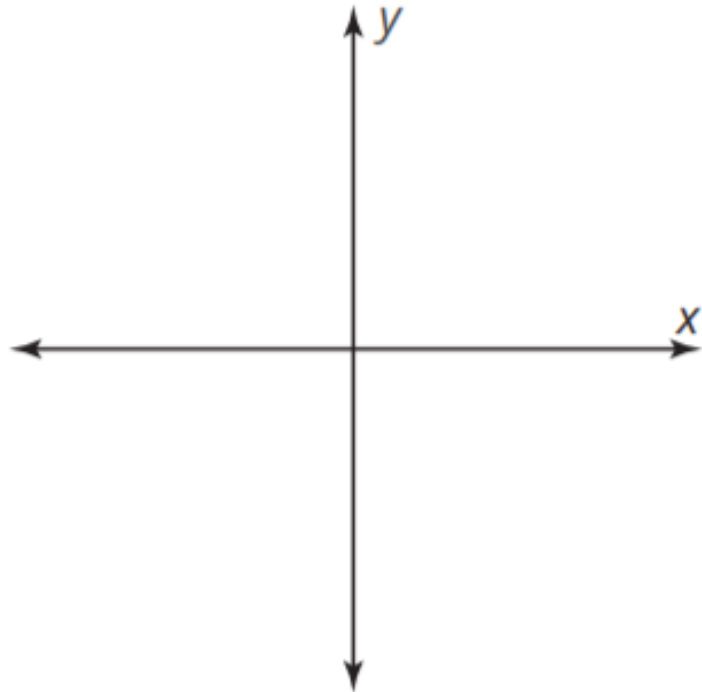
2. **How much money did Maya initially invest? Explain how you determined your answer.**

3. The function that models Maya's investment over time has a maximum value.
- a. What was the greatest value of Maya's investment account over the time of her investment? Show your work.
 - b. How much time did it take for Maya's account to reach its maximum value?
 - c. On average, how much did Maya's account gain in value each month from the time she opened the account to the time it reached its maximum value?

Consider the quadratic function $h(t) = -5(t - 3)^2 + 60$.

M3-224

1. Sketch a graph of the function and label the vertex and the y -intercept. Explain your work.



2. Identify the table that represents the function. Explain why you eliminated the other tables.

A

t	$h(t)$
-1	55
0	60
1	55
2	40

B

t	$h(t)$
0	45
1	20
4	5
5	20

C

t	$h(t)$
$-\sqrt{12} + 3$	0
0	15
3	60
$\sqrt{12} + 3$	0

D

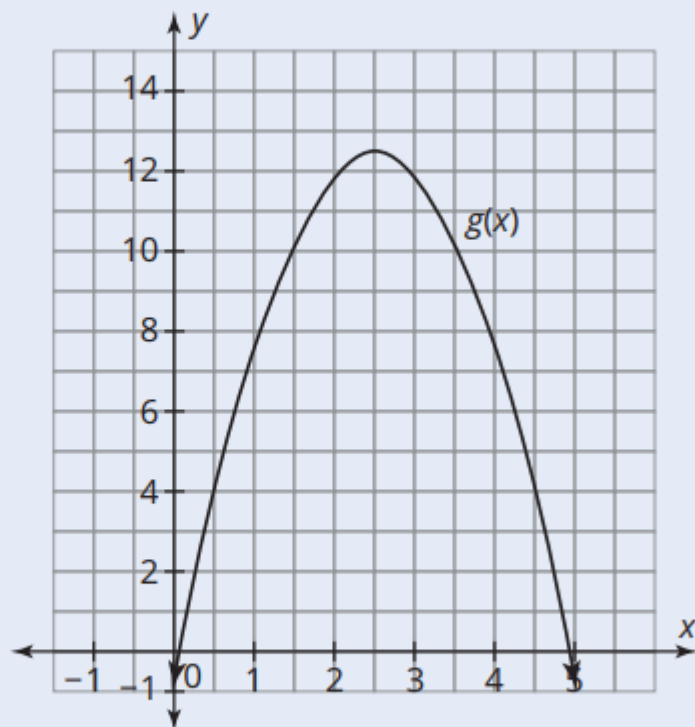
t	$h(t)$
$-\sqrt{12} + 3$	-60
0	-45
3	0
$\sqrt{12} + 3$	-60

3. Describe how the function $h(x)$ has been transformed from the basic function $f(x) = x^2$.



1. Josiah compared the table of values for $f(x)$ and the graph of $g(x)$ to determine which quadratic function has the greater maximum.

x	$f(x)$
-1	0
0	4.5
1	8
2	10.5
3	12



Josiah says that the function $g(x)$ has a greater maximum, because it has an output value greater than 12 at its maximum while the table for $f(x)$ shows a greatest output of 12. Is Josiah's reasoning correct? Explain your answer.

- 2. Approximate the absolute maximum for each function.
Show your work.**

3. Compare these two drone flights, launched at the same time.

M3-226

The height in feet of Corinne's drone flight over time in seconds can be approximated by the function $c(x) = -3x^2 + 7x + 1$.

The table of values shows the height in feet of Ben's drone at different times.

x	$b(x)$
0	4
0.25	4.25
0.5	4
1	2
1.281	0

- a. Which flight began at a higher elevation? How do you know?

- b. Which drone began descending first? Show your work.

- c. Which of the drones had a greater average increase in height over time up to its maximum height? Explain your reasoning.